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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/604,487	07/25/2003	Hendrik F. Hamann	FIS920020166US1	1486

32074 7590 03/30/2005

INTERNATIONAL BUSINESS MACHINES CORPORATION  
DEPT. 18G  
BLDG. 300-482  
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EXAMINER

ARANCIBIA, MAUREEN GRAMAGLIA

ART UNIT PAPER NUMBER

1763

DATE MAILED: 03/30/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> <u>10/604,487</u>		<b>Applicant(s)</b> HAMANN ET AL.	
	<b>Examiner</b> Maureen G. Arancibia		<b>Art Unit</b> 1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 14 January 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,3,4,7-9,11,14 and 17-30 is/are pending in the application.
- 4a) Of the above claim(s) 17-30 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3,4,7-9, 11 and 14 is/are rejected.
- 7) ☒ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

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## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election without traverse of Group I, Claims 1-16 in the reply filed on 1/14/2005 is acknowledged.
2. Claims 17-30 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 1/14/2005.

### ***Double Patenting***

3. The rejections under the judicially created doctrine of obviousness-type double patenting over copending Application Nos. 10/261,275 and 10/604,486 and U.S. Patents 6,787,783 and 6,730,237 have been withdrawn in view of the incorporation of original Claim 6 into Claim 1.

### ***Allowable Subject Matter***

4. The indicated allowability of Claim 9 is withdrawn in view of the newly discovered reference(s) to Dykhno et al. (U.S. Patent 6,388,227) and Izadpanah et al. (U.S. Patent 6,735,398). Rejections based on the newly cited reference(s) follow.

### ***Claim Objections***

5. Claims 1, 3, 4, 7-9, 11, and 14 are objected to because of the following informalities: the terms "local" and "proximate" recited in the claims are broad terms that have not been explicitly defined in the Specification. Accordingly, the Examiner turned to the *American Heritage Concise Dictionary*, which defines "local" as "or or relating to a particular place," and "proximate" as "close in space" or "near." The claims

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have been interpreted in accordance with these definitions. However, clarification of this point is suggested.

***Claim Rejections - 35 USC § 102***

6. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

7. Claims 1, 3, and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 6,316,153 to Goodman et al.

Goodman et al. teaches a method for altering a feature on a substrate, comprising: locally delivering a chemical to a site proximate to the target feature (Column 8, Lines 59-61), and providing activating energy at said site by illuminating a probe tip (the tip of a pipette barrel), thereby creating near-field radiation. (Column 8, Lines 28-37 and 61-62) A chemical reaction takes place, resulting in alteration of the surface feature. (Column 9, Line 9 - Column 12, Line 8)

Note that the recitation in Claim 1 that the method is "for altering a surface feature of an existing pattern" has not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951). Moreover, the structures formed

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by the reaction step of the method taught by Goodman et al. (Column 5, Lines 35-38) would be capable of altering some existing pattern on the substrate.

In regards to Claim 3, Goodman et al. teaches that the local delivery is performed by passing said chemical through a probe tip channel (a barrel of the multiple-barrel pipette) having an opening placed proximate to said site. (Column 8, Lines 59-61)

In regards to Claim 11, Goodman et al. teaches that a second chemical can be provided for assisting in said reaction. (Column 9, Lines 1-5)

8. Claims 1 and 3 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 6,388,227 to Dykhno et al.

Dykhno et al. teaches a method for altering a feature on a substrate, comprising: locally delivering a chemical to a site proximate to the target feature (Column 11, Lines 47-55), and providing activating energy at said site by illuminating a probe tip. (Figure 5; Column 12, Lines 30-41) Milling takes place, resulting in alteration of the surface feature. (Column 16, Lines 24-26)

Note that the recitation in Claim 1 that the method is "for altering a surface feature of an existing pattern" has not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*,

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187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951). Moreover, the method taught by Dykhno et al. would be capable of altering some existing pattern on the substrate.

In regards to Claim 3, delivery is performed by passing said chemical through a probe tip channel 124 having an opening placed proximate to the site to be altered.

***Claim Rejections - 35 USC § 103***

9. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Goodman et al. as applied to Claim 1 above in view of U.S. Patent Application Publication 2002/0063212 to Mirkin et al.

The teachings of Goodman et al. were discussed above.

Goodman et al. does not expressly teach that the local delivery of a chemical can be performed by placing a probe tip coated with said chemical proximate to the site to be altered.

Mirkin et al. teaches that local delivery of a chemical can be performed by placing a probe tip (SPM tip) coated with said chemical proximate to a site to be altered.  
(Paragraph 56 and 79)

It would have been obvious to one of ordinary skill in the art to modify the method taught by Goodman et al. to deliver the chemical by placing a coated probe tip proximate to the site to be altered, as taught by Mirkin et al. The motivation for doing so, as taught by Mirkin et al. (Paragraph 101), would have been to deliver the chemical on a molecular scale with good resolution.

10. Claims 7, 8, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goodman et al. as applied to Claim 1 above, in view of "Strength of Electric Field in

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Apertureless Near-Field Optical Microscopy" by Martin et al. (IBM Research Report, RC21891 (98484) 11/9/2000; from Applicant's IDS), as evidenced by "Absorption of electromagnetic radiation" by West (AccessScience@McGraw-Hill, <http://www.accessscience.com>, DOI 10.1036/1097-8542.001600, last modified: March 6, 2001.)

The teachings of Goodman et al. were discussed above, including the generation of near-field radiation. (Column 8, Lines 28-37 and 61-62)

Goodman et al. does not expressly teach that the probe comprises a non-metal portion and a metal apex portion, causing localized scattering of photons, or that the illumination wavelength is at least about ten times greater than the diameter of the probe tip apex.

Martin et al. teaches that optical near-field enhancement can be produced by illuminating a gold probe tip mounted on a non-metal probe. (Conclusion, second paragraph) The tip acts as a scatterer. (Conclusion, first line) Martin et al. also teaches that the tip can be hemispherical, with a diameter less than one-thirtieth of the wavelength of the illumination. ( $D=20$  nm,  $\lambda=633$  nm; "Modified Tips," third paragraph)

It would have been obvious to one of ordinary skill in the art to modify Goodman et al. to enhance the near-field radiation by generating photon scatter from the probe, as taught by Martin et al. The motivation for using a non-metal probe tipped with a metal apex to cause localized photon scatter, as taught by Martin et al. ("Conclusion," second paragraph), would have been that the different material composition at the tip helps to recover resonance effects, thereby further enhancing the electric field at the tip. The

motivation for having the diameter of the tip be less than one-thirtieth of the wavelength of the illumination would have been to avoid the dephasing effects from larger-dimensioned tips. ("Electric field enhancement for real tip systems," second paragraph)

Neither Goodman et al. nor Martin et al. expressly teaches that the localized photon scatter imparts thermal energy to the substrate, as recited in Claim 14. Nevertheless, the impact and absorption of the scattered photons would inherently impart thermal energy to the substrate. (See West, first paragraph)

11. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Goodman et al. as applied to Claim 1 in view of Dykhno et al. and U.S. Patent 6,735,398 to Izadpanah et al.

The teachings of Goodman et al. were discussed above.

Goodman et al. does not expressly teach that the probe comprises at least two electrodes with a gap there between, that the illumination comprises coherent radiation, or that interaction between the electrodes and the illumination energy causes formation of a plasma between the electrodes.

Dykhno et al. teaches that a probe to be illuminated (Figure 5) comprises at least two electrodes 130, 230 with an applied ac current of about 10 to 250 Amps (Column 2, Line 43; Column 13; Lines 44-46); that the illumination 114 comprises coherent, pulsed laser radiation (Column 12, Lines 42-44; Column 15, Line 20); and that interaction between the electrodes and the illumination energy causes formation of plasma between the electrodes. (Column 16, Lines 12-19)



It would have been obvious to one of ordinary skill in the art to modify the method taught by Goodman et al. for the probe to comprise at least two electrodes with a gap there between, for the illumination to comprise coherent radiation, and for interaction between the electrodes and the illumination energy to cause formation of a plasma between the electrodes, as taught by Dykhno et al. The motivation for making such modifications, as taught by Dykhno et al. (Column 16, Lines 12 - Column 17, Line 26), would have been that the stable, contained plasma thus obtained, in concert with the radiation itself, focus a large amount of energy at the target site, causing ablation and welding.

The combination of Goodman et al. and Dykhno et al. does not expressly teach that the illumination of pulsed laser radiation should comprise coherent radiation of two wavelengths.

Izadpanah et al. teaches that pulsed radiation can be obtained by combining the output of two laser sources with different wavelengths (and frequencies). (Column 6, Lines 9-14)

It would have been obvious to one of ordinary skill in the art to further modify the combination of Goodman et al. and Dykhno et al. to create the pulsed radiation by combining the output of two laser sources, as taught by Izadpanah et al. The motivation for making such a modification would have been to allow the pulse train of the radiation to be fine-tuned.

12. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dykhno et al. as applied to Claim 1 in view of Izadpanah et al.

The teachings of Dykhno et al. were discussed above. Additionally, Dykhno et al. teaches that a probe to be illuminated (Figure 5) comprises at least two electrodes 130, 230 with an applied ac current of about 10 to 250 Amps (Column 2, Line 43; Column 13; Lines 44-46); that the illumination 114 comprises coherent, pulsed laser radiation (Column 12, Lines 42-44; Column 15, Line 20); and that interaction between the electrodes and the illumination energy causes formation of plasma between the electrodes. (Column 16, Lines 12-19)

Dykhno et al. does not expressly teach that the illumination of pulsed laser radiation should comprise coherent radiation of two wavelengths.

Izadpanah et al. teaches that pulsed radiation can be obtained by combining the output of two laser sources with different wavelengths (and frequencies). (Column 6, Lines 9-14)

It would have been obvious to one of ordinary skill in the art to further modify the combination of Goodman et al. and Dykhno et al. to create the pulsed radiation by combining the output of two laser sources, as taught by Izadpanah et al. The motivation for making such a modification would have been to allow the pulse train of the radiation to be fine-tuned.

### ***Response to Arguments***

13. Applicant's arguments filed 1/14/2005 have been fully considered but they are not persuasive.

a. In response to applicant's arguments, the recitation in Claim 1 that the method is "for altering a surface feature of an existing pattern" has not been

given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

b. In response to applicant's argument that the combination of references presented in the prior Office Action would not result in a workable process, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

c. In response to applicant's argument regarding West, it is noted that West is cited as evidence that scattered photons would inherently impart thermal energy to the substrate, not as a reference to be combined.

d. In regards to applicant's argument regarding the local delivery of chemicals, it is noted that this limitation was not positively recited in the original Claim 1, but was rather recited as an alternative to providing the activating energy locally.

**Conclusion**

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patent 5,844,251 to MacDonald et al. teaches a probe tip with electrodes.


15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maureen G. Arancibia whose telephone number is (571) 272-1219. The examiner can normally be reached on core hours of 10-5, Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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